AWWA Free Water Audit Software:
Reporting Worksheet

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Los Banos Public Works (2410005)
Reporting Year: 2017 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED				Pcnt:	Value:	
Volume from own sources:	5	2,415.300	MG/Yr	0.10%		MG/Yr
Water imported:	n/a	0.000	MG/Yr			MG/Yr
Water exported:	n/a	0.000	MG/Yr			MG/Yr
WATER SUPPLIED:		**2,412.887**	MG/Yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION				Pcnt:	Value:	
Billed metered:	3	2,043.300	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	n/a	0.000	MG/Yr			
Unbilled unmetered:	5	6.032	MG/Yr		6.032	MG/Yr
AUTHORIZED CONSUMPTION:		**2,049.332**	MG/Yr			

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)				Pcnt:	Value:	
		363.555	MG/Yr			
Apparent Losses						
Unauthorized consumption:		6.032	MG/Yr	0.20%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	1	20.639	MG/Yr	1.00%		MG/Yr
Systematic data handling errors:		5.108	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses:		**31.780**	MG/Yr
Real Losses (Current Annual Real Losses or CARL)			
Real Losses = Water Losses - Apparent Losses:		**331.775**	MG/Yr
WATER LOSSES:		**363.555**	MG/Yr

NON-REVENUE WATER			
NON-REVENUE WATER:		**369.587**	MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA			
Length of mains:	7	170.0	miles
Number of active AND inactive service connections:	10	12,021	
Service connection density:		71	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line:			

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	6	49.4	psi

COST DATA				
Total annual cost of operating water system:	10	$4,236,140	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$1.96	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$276.54	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 54 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: City of Los Banos Public Works (2410005)
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*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 54 out of 100 ***

System Attributes:

	Apparent Losses:	31.780	MG/Yr
+	Real Losses:	331.775	MG/Yr
=	**Water Losses:**	**363.555**	MG/Yr

?	Unavoidable Annual Real Losses (UARL):	49.10	MG/Yr
	Annual cost of Apparent Losses:	$83,268	
	Annual cost of Real Losses:	$91,750	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	15.3%	
	Non-revenue water as percent by cost of operating system:	4.2%	Real Losses valued at Variable Production Cost

Operational Efficiency:	Apparent Losses per service connection per day:	7.24	gallons/connection/day
	Real Losses per service connection per day:	75.62	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	1.53	gallons/connection/day/psi

	From Above, Real Losses = Current Annual Real Losses (CARL):	331.78	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	6.76	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	CRUC was calculated y dividing the total consumptive revenue ($5,341,512.16) by the Billed metered authorzed consumtion (2043.3 MG = 2,731,494.792 hcf) = $1.96 / 100 cubic feet
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association

Water Audit Report for:	City of Los Banos Public Works (2410005)
Reporting Year:	2017 (1/2017 - 12/2017)
Data Validity Score:	54

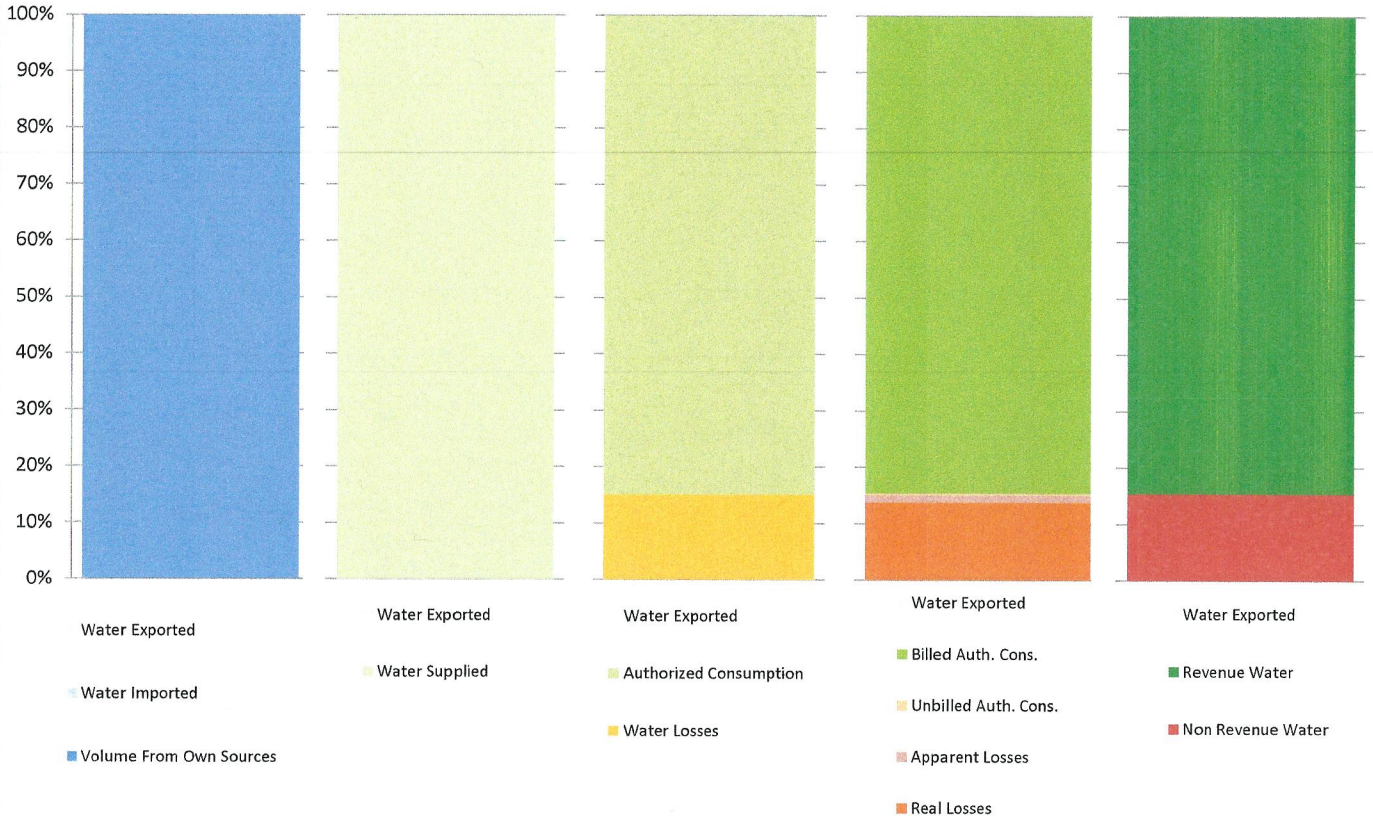
		Water Exported 0.000			Billed Water Exported	Revenue Water 0.000
Own Sources (Adjusted for known errors) 2,412.887	System Input 2,412.887	Water Supplied 2,412.887	Authorized Consumption 2,049.332	Billed Authorized Consumption 2,043.300	Billed Metered Consumption (water exported is removed) 2,043.300	Revenue Water 2,043.300
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 6.032	Unbilled Metered Consumption 0.000	Non-Revenue Water (NRW) 369.587
					Unbilled Unmetered Consumption 6.032	
			Water Losses 363.555	Apparent Losses 31.780	Unauthorized Consumption 6.032	
					Customer Metering Inaccuracies 20.639	
					Systematic Data Handling Errors 5.108	
Water Imported 0.000				Real Losses 331.775	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

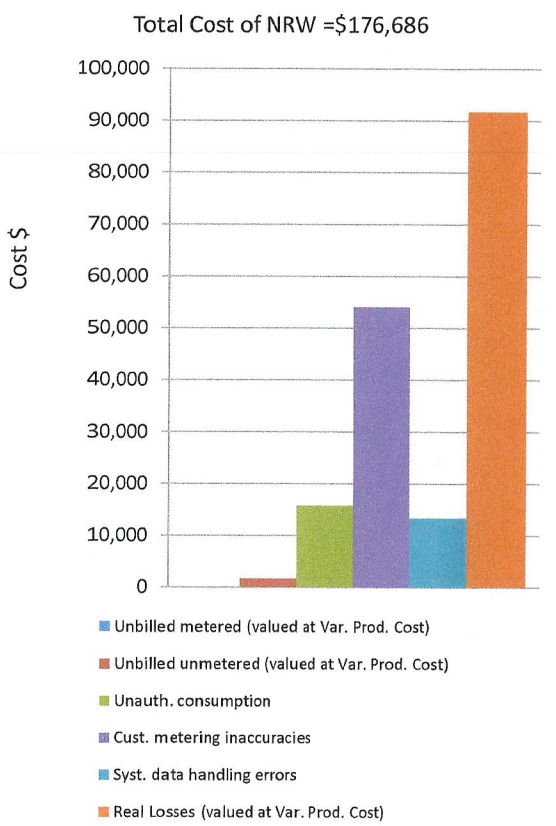
AWWA Free Water Audit Software:
Dashboard

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for:	City of Los Banos Public Works (2410005)	
Reporting Year:	2017	1/2017 - 12/2017
Data Validity Score:	54	

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software:
Determining Water Loss Standing

WAS v5.0

Water Audit Report for: City of Los Banos Public Works (2410005)
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Data Validity Score: 54

Water Loss Control Planning Guide

	Water Audit Data Validity Level / Score				
Functional Focus Area	**Level I** (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI (without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term planning.
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

CAVANAUGH
Stewardship Through Innovation

Validator Provided

2017 AWWA Water Audit Level 1 Validation - Review Document

Audit Information:

Utility: City of Los Banos PWS ID: 2410005

Audit Period: Calendar 2017 System Type: Potable

Utility Representation: Randy Williamson (Water Quality Specialist)

Validation Call Date: 6/5/2018 Call Time: 9am Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 54 Data Validity Band (Level): Band III (51-70)

ILI: 6.76 Real Loss: 75.62 (gal/conn/day) Apparent Loss: 7.24 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 4.2%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Validator Information:

Water Audit Validator: Drew Blackwell Validator Qualifications: Contractor for California Water Loss TAP

2017 AWWA Water Audit Level 1 Validation

Water System Name: **Water System ID Number:** **Water Audit Period:**

Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

Utility Provided

<<Information to be completed by Utility>>

1. UTILITY OPERATORS RECORD WATER PRODUCTION FROM WATER WELLS DAILY. WEEKENDS AND HOLIDAYS INCLUDED.
2. UTILITY CONTINUOUSLY CHANGES OUT OLD METERS AND REPAIRS ANY STUCK OR DAMAGED METERS IMMEDIATELY.
3. LEAKS ARE REPAIRED WITHIN 1-2 BUSINESS DAYS. DEPENDING ON SEVERITY LARGE LEAKS WILL BE REPAIRED THE SAME DAY OF DISCOVERY. (EMERGENSIES).

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

RANDY WILLIAMSON	WATER QUALITY SPECIALIST		6/26/18
Executive Name (Print)	Executive Position	Signature	Date